DOCUMENT RESUME

ED 039 310 24 UD 010 290

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TITLE	Early Childhood Education as an Intervention in the Child's Ecological System.
INSTITUTION	National Lab. on Early Childhood Education.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
BUREAU NO	BR-7-0706
PUB DATE	17 May 69
CONTRACT	OEC-3-7-70706-3118
NOTE	25p.
EDRS PRICE	EDPS Price MF-$0.25 HC-$1.35
DESCRIPTORS	Behavior Patterns, Childhood Attitudes, Cognitive Objectives, *Disadvantaged Youth, *Early Childhood Education, *Environmental Criteria, Family Influence, *Instructional Programs, Intellectual Development, Interpersonal Competence, *Intervention, Longitudinal Studies, Mother Attitudes, Object Manipulation, Parent Child Relationship, Research Criteria, Skill Development, Socialization

ABSTRACT

This document describes the instructional programs and results of a second major longitudinal intervention program carried out at George Peabody College for Teachers, Nashville, Tennessee, and addresses itself to different research questions and develops instructional programs considered more extensive and systematic than an earlier study, The Early Training Project. Of the two intervention strategies, the objective environment (world of things which a child manipulates) and the instrumental environment (world of people), this study employs the latter, the effective instrumental agent being the mother. In identifying the four variables (cognitive, motivational, personal style, and physical variables) associated with development of competency, some representative research findings are considered. The instructional programs both for the mother and for the target child are described in detail. In the mother's program, called the Support System Mother's Program, the major objective in the cognitive domain was to change her pattern of interaction with the child by providing skills and resources which she could call upon to stimulate her child intellectually. In the child's program, called Socialization for Competence, provision is made for organizing and structuring skills to be learned. Partial interim results indicate, it is held, that the programs were generally successful although evaluation of soundness of the approach must wait. (RJ)

OE/BR 7-0706
UD

ED039310

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Presentation to the National Academy of Education

May 17, 1969

The research or work reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare through the National Coordination Center of the National Laboratory on Early Childhood Education, contract OEC-3-7-70706-3118.

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UD010296

Early Childhood Education as an Intervention in the Child's Ecological System

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Introduction

Before describing the instructional programs and results of a second major longitudinal intervention program carried out at Peabody College, I would like to present the rationale and assumptions underlying this work. Growing logically out of an earlier study, The Early Training Project (Gray, Klaus, Miller and Forrester, 1966; Klaus and Gray, 1968) conducted by Susan Gray and Rupert Klaus, the second program addressed itself to different research questions and developed more extensive and systematic instructional programs.

Rationale

In our work with disadvantaged children and their families, we have taken the stand that environmental inadequacy is the primary factor leading to progressive intellectual retardation and the inability to cope effectively in an increasingly complex society. The cycle of defeat and failure is self perpetuating creating an ever more apparent gap between those caught in its grip and those reaping the benefits of an affluent society. The choice point for intervention in the cycle has been during early childhood, around three years of age.

In designing an intervention strategy based on the assumption of environmental inadequacy, two major dimensions of the environment have received attention. The first of these dimensions I shall call the objective environment, or the world of things which the child manipulates. The objective environment provides stimulus input which must be processed contributing materially to intellectual and motivational development. The objective environment provides feedback to the child as to the relevance of his attending and exploratory behavior, which in turn affects his ability to efficiently process information and utilize it effectively. It provides reinforcement for his manipulative behaviors, and this helps to develop a concept of personal control over his world and himself.

The second dimension, perhaps the more important, is the instrumental environment or the world of people. The instrumental environment consists of those significant others who mediate between the child and the objective environment by imposing temporal and

spatial order upon it. The effective instrumental agent interacts with the child, continuously providing behavior models and arranging appropriate reinforcement contingencies which encourage and sustain continued development and motivation. These considerations mediate for an active, or participating, involvement with a child rather than a passive, or observing, detachment if positive change is to occur.

The child, then, is seen as a part of an ecological system whose elements are in continuous interaction. This interchange can be stimulating and supportive providing the conditions for continued growth and development of competency or, if either of these major environmental dimensions are inadequate, the interaction will inhibit, restrict or pervert development. Only by attending to all the essential elements of the system, can we expect positive development to occur and be sustained.

During the child's early formative years, the instrumental environment is primarily the family and, more specifically, the effective instrumental agent is the mother. Our intervention strategy has been directed at the mother as well as the child while self-consciously recognizing that our intrusion adds another factor in the basic ecologic system. *

A prime source for identifying the variables associated with the development of competency has been the research literature. Particularly, the body of comparative literature which has lent support to the hypothesis of environmental inadequacy, has given direction to the development of the instructional programs for both the mother and the child. For purposes of organization, these variables have been

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* I have come to believe that an essential condition for systematic development is the capacity to accommodate change rather than resist it if the system is to be effective in its mission. It might be taken one step further. Not only must it be able to <u>accommodate</u> change (essentially a respondent position), but it must be able to utilize the effects of change to manage and optimize the development of the total system. This concept might be generalized to more molar systems than that of the child. Our institutions, specifically our educational system, seem to be caught up in this very problem, an inability to accommodate and utilize change. The system seems to be much more geared to resisting change and retaining the status quo.

divided into four major classes: (1) cognitive variables, those skills and abilities which are necessary to function at a level of abstraction required to be competent in a highly technical society, including such abilities as language and conceptual and perceptual skills; (2) motivational variables, sustaining states which support continued skill development and maintenance and orient the individual toward a high level of task performance, including such things as need achievement, persistence, delay of gratification and interest in cognitively stimulating tasks; (3) personal style variables, those variables which define approach behaviors in problem-solving situations such as self-concept, success-failure orientation, impulsivity-reflectivity, and time orientation; (4) physical variables, such variables as nutritional conditions, large- and small-muscle coordination and other physiological factors which are necessary to sustain continued performance output.

An exhaustive survey of the literature will not be presented on these four functional categories related to competence, but some representative research findings will be presented as the cornerstone for the development of intervention strategies with both the children and their mothers in our second major project.

Cognitive Variables. Lesser, Fifer, and Clark (1965) studied differential and mental abilities, including verbal ability, reasoning, number facility, and space conceptualization as they relate to social class and ethnic group membership. A large group of first grade children was divided into middle- and lower-class socioeconomic groups according to their ethnic background: Chinese, Jewish, Negro, or Puerto Rican. Social class placement was associated with significant differences in ability patterns. Ethnic group differences were related to both absolute level of each mental ability and the patterns among these abilities. Interestingly, social class and ethnicity interacted to effect absolute ability levels but not to effect ability patterns. Since the pattern of performance within ethnic subgroups was similar across social class levels, it appeared that a selective perceptual and learning set was exerted upon the membership. Ethnic groups also apparently place differential importance upon skills, depending upon the child's sex. The findings of these investigators suggest that ethnic group membership, the child's sex, and patterns as well as level of performance must be taken into consideration when planning intervention programs.

When compared with middle class subjects, disadvantaged children have been shown to be deficient in many aspects of language

ability, both qualitatively and quantitatively (Siller, 1957; Bernstein, 1961-1962; Deutsch, 1965; Jensen, 1963; Irwin, 1948a and 1948b). Lower class children spend less time in interaction with adults (Keller, 1963); and when in communication with adults, their verbalizations are significantly shorter (C. Deutsch, 1964). Hess and Shipman (1965) believed the paucity and impoverishment in the mother-child communication system is the heart of the lack of language development among the disadvantaged. Their assessment of mother teaching styles and information processing strategies clearly indicated that the verbal output, the level of conceptualization, as well as the quality and focus of the mother-child interaction, are significantly poorer among lower class subjects. On tasks which require precision and abstract language and conceptualization, Deutsch (1965) found that middle class children were superior. Their superiority increased from the first to the fifth grades, leaving them to conclude that early intervention is necessary to offset the accumulative deficit these data reveal.

Recognition vocabulary, vocabulary of use, length of remark, and complexity of sentence forms are all significantly below norms for disadvantaged children (Jones, 1966). These findings are consistent with those of Bernstein (1965), who interpreted his findings as indicative of differential encoding processes between classes. It is his observation that lower classes use a restricted language pattern which functionally retains group integrity and status. Group solidarity is maintained through such a restricted encoding pattern by excluding non-group members from sharing in the ingroup communication. It restricts the ability of the lower-class person to communicate effectively with those outside the group. On the other hand, the middle class develops elaborated codes which are capable of transmitting information at high levels of intensity and meaning within a variety of social contexts.

Such elaborated codes require a high level of abstract usage. The ability to label and classify, use hierarchial categorization, and discriminate relevant stimulus cues and dimensions is related to effective informational processing and is substandard among the disadvantaged (Ryckman, 1966; Spain, 1962; Clark and Richards, 1966; Jensen, 1966). Ryckman (1966) concludes from his factor analytic study of cognitive abilities, "Since general language ability is the major differentiating characteristic between class groups and is a central element for information processing, it appears highly essential to give language training a central place in the (intervention) program framework."

Motivational Variables. This category consists of those learned attitudes which maintain the task orientation of the individual and retain task relevant involvement necessary for achievement. They seem to be highly related to reinforcement contingencies and types of rewards available in the environment. Disadvandaged children prefer concrete rewards over more abstract reinforcement in learning tasks (Terrel, Durkin, and Wiesley, 1959), while advantaged children perform at a higher level and prefer abstract reinforcements (Zigler and de Labry, 1962). Disadvantaged children prefer immediate reinforcement over delayed reinforcement even when greater rewards would be obtained under the delay condition. The ability to delay gratification is related to socioeconomic status, higher intellectual functioning and such family variables as father presence or absence and conditions of family disorganization (Mischel and Metzner, 1962; Mischel, 1961; Kahl, 1965; Maitland, 1966; Steen, 1966). Strauss (1962) has documented the relationship of deferred gratification and need achievement to social class.

The affluent society has been characterized as an achievement-oriented society. It is not surprising to find that members of the affluent main stream would evidence a high degree of achievement motivation. McClelland and his associates (1955) have provided much of the stimulation for study of n achievement. Of particular interest is the relationship of n achievement to family variables. Rosen and d'Andrade (1959) demonstrated that parents of high n achievement boys were more competitive, took more pleasure in problem-solving experiments and were more involved with their children than parents of low n achievement boys. Fathers of high n achievement boys stressed independence and tended to let their sons develop self-reliance by giving hints to the solution of problems, rather than doing the problem for them. This is an interesting contrast to the mother teaching styles of Hess and Shipman's (1965) lower class subjects. Just as Hess and Shipman found greater language facility with their middle-class subjects, who presumably show greater n achievement, so Buehr (1965) found that high n achievement boys manifest less dialect in their speech under achievement oriented situations.

Personal Style Variables. It is much more difficult to draw a direct line between this group of variables and adequate achievement. Gordon and Wilkerson (1966) suggest that such a variable as self-concept may not be an important dimension of the problem since either positive or negative self-regard may be related to high achievement. With that word of caution in mind, we can say that disadvantaged

children do evidence significantly lowered self-esteem than more advantaged children (Long and Henderson, 1967; Coleman, 1966; Keller, 1963). These feelings of inadequacy seem to be related to failure experiences in the school environment. The concept of personal control implies a feeling of responsibility for that which happens to one and is related to social class (Battle and Rotter, 1963). Disadvantaged boys lack persistence in a school-related task and evidence a lower sense of control over the environment than more advantaged children. Poor achievers among the disadvantaged groups give higher evaluative ratings for school subjects in which they are achieving poorly than do better achievers (Greenberg and others, 1965). These findings seem to be consistent with a greater discrepancy between actual performance and level of aspiration found among the disadvantaged (Hieronymus, 1951; Keller, 1963).

Academic achievement is related to a personal style dimension which Kagan has labeled "impulsivity-reflectivity." The more reflective response tendency is related to higher reading achievement, social class, and intellectual ability (Kagan, 1965; Miller and Mumbauer, 1967).

Disadvantaged children are more present-oriented than future-oriented (LeShan, 1952). In a study of the relationship of home environmental variables to high and low potential success in school among Mexican-American children, Henderson (1966) found that the low potential families were more concerned with meeting daily needs than providing experiences that will have a future educational payoff.

M. Schoggen (1967) of our laboratory, in her ecological studies of disadvantaged homes, reports that disorganization can be characterized in terms of lack of temporal and spatial organization. The most disorganized homes do not even have a regular mealtime. Regular mealtime represents the most basic time ordering event by which one can begin to develop time concepts and a future orientation.

Physical Variables. A basic need for productive achievement is a reasonable state of physical health. However, among the disadvantaged, the wherewithal to provide adequate medical care is unavailable. The proportion of the population suffering from chronic ill health because of the lack of medical care rises sharply as income decreases. The incidence of chronic health problems is almost four times as great among disadvantaged families (income under $2,000) when compared with more advantaged families ($7,000 annual income and up). (MacDonald, 1966)

Nutritional deficiencies are probably the greatest single deterrent to adequate physical health. Inadequate and substandard diets, particularly when sustained by the pregnant mother, are the cause of a higher rate of infant mortality, prematurity, and birth defects among the disadvantaged than any other single cause. Liebow (1967) points out that pregnant disadvantaged women often eat as many as four boxes of Argo laundry starch a day.

Before describing the instructional Programs, I would like to describe the research problems to which this intervention project was and is directed. From the experimental standpoint, we have been attempting a systematic assessment of the agents and conditions of change which enhance the diffusion of competency within a family. We are concerned with a spread of effect phenomenon, if you will, within a family as a consequence of active intervention with one or more other members of the family. We have labeled this "vertical diffusion" because the evidence thus far seems to indicate that it is an effect that moves downward. The vertical diffusion effect was first noticed in the Early Training Project (Klaus and Gray, 1968), where two groups of preschool children had been provided two- or three-week summer school programs and regular between-session home contacts to maintain the progress gained during the summer. The summer program objective was to provide organized experiences designed to enhance the child's chances of coping effectively with formal schooling.

Following the experimental program it was found that the younger siblings of the experimental groups, when compared with the young siblings of the control or comparison groups, showed a significant 13 point I.Q. differential in favor of the experimental children. This intriguing post hoc finding was attributed to the inter-session contact the project home-visiting teacher had had with the mothers of the experimental children. The home visiting program had been designed to maintain the effects of summer intervention itself by providing skill development for the mother so that she could be a more effective agent in structuring and implementing activities similar to those which the children were having during the summertime.

Accepting the significant performance difference as the result of a change in the child's ecological system along at least one of the critical environmental dimensions I have suggested earlier, provides the raison de'etre for the experimental questions. (1) Is the effect of diffusion reliable? (2) Is the mother the crucial instrument agent?

(3) Will early intervention in the system provide the sustaining conditions for continued growth and development of the child? Assuming the relevant dimension is that of the instrumental environmental agent, the mother, our strategy has been to systematically include her in an instructional program designed to enhance her ability to cope more effectively in the child's ecological system.

The general design of the study included four groups, each receiving a different treatment or intervention program. I will describe each of these four groups but again call to your attention that it is the younger siblings in the family who, while not directly a target of the intervention program, form the experimental groups with whom we are most concerned from an experimental standpoint. The first group was designated the Maximum Impact Group, where both the mother and a target child of the family came to the center for a training program. The mother came to the center once a week; the child, five days a week. The mother's training program was a sequential process of skill development and movement from directed observations to actual classroom participation in a teaching role. In addition, a home-visiting teacher called at the home to stimulate use of the mother's newly learned skills in the training program. Continual reinforcement was provided in group session meetings, where the mothers shared successes with their peers. The children's program was a comprehensive developmental curriculum to foster socialization for competence. It centered about the development of aptitudes of skills for environmental mastery and the development of sustaining attitudes necessary for continued growth.

In the second group, the target child of the family was the only member enrolled in a program. In this curriculum group, the child was provided a classroom program which was a replication of that received by the Maximum Impact target child.

The third group was designated the Home Visitor Group. Here the family had no direct contact with the Early Training Center but was visited in the home once a week by a home-visiting teacher who worked directly with the mother and used the child to demonstrate the techniques and procedures consistent with the classroom programs.

The fourth group was a natural environmental group carefully chosen to match the demographic characteristics of the treatment families. But members of this group received no planned intervention other than periodic assessment and testing.

The children within the classroom groups were at an age which permitted them to begin the first grade in a regular elementary school in September 1968, after two-and-a-half years enrollment in the Early Training Centers. Each of the children in the program who were to be targets of one of the intervention programs had to have at least one younger sibling. Preferably the mothers were young and relatively early in their child-bearing careers in order to insure follow-up potential with younger children. Subjects who met this criteria completely exhausted the available population in the 640-unit housing project. We were able to obtain forty children for our two classroom groups and twenty for our visiting group, however, and on March 21, 1966, the intervention project began.

The specified formal areas of concern have been language maturity, intellectual functioning, concept formation, cognitive style, and variables--such as achievement press--in the home environment conducive to development. While these formal areas of concern have kept us scientifically legitimate, we have collected data on such informal and unobtrusive indices of improved adequacy as the mother's ability to plan, to organize and to implement appropriate objectives in the home, the upgrading of her own level of aspiration as reflected in improved occupational status and her use of classroom learned methods and procedures in instructing her children at home. These may prove to be much more important markers of experimental effectiveness than the traditional psychometric measures.

The Instructional Programs

Now to the instructional programs. Because of the differential effect upon the younger siblings in the family, I believe it is crucial to describe both the program for the mother and the program for the target child (not the younger sibling).

The Support System Mothers' Program. Most of the mothers were employed as domestic or kitchen help at the beginning of the project. In order to insure that they would not be penalized for participation in the program, they were reimbursed $5.00 for their one-day-per-week participation. In addition, cooperative babysitting arrangements were made in the mothers' groups so that they could attend the training program at the Center. It might be observed that mothers from disadvantaged environments are sometimes criticized for lack of interest in their children when they fail to attend afternoon meetings of the local

P. T. A. To attend the meetings, however, might mean the sacrifice of a day's wages from an already marginal income.

The major objective in the cognitive domain for the mother was to change her pattern of interaction with the child by providing skills and resources which she could call upon to stimulate her child intellectually. Such activities as learning how to read pictures to a youngster, to read storybooks, to play counting and singing games and to take advantage of those opportunities for intellectual enrichment ever present in the environment were actively stressed in the mother's curriculum. In the motivational domain, the major objective was to develop a better support system for the child, a system supportive of his inquisitiveness, his accomplishments, and his aspirations. Through observation and active classroom participation, the mothers were encouraged to use the positive reinforcement techniques demonstrated for them by teachers. They were encouraged in their observation to be aware of the child's progress and to support continued development actively. Indeed the curriculum was so designed that many self-help skills for the mother were included. Planned to develop her own motivations, they were carefully woven into the curriculum. Many opportunities to develop skills in food purchasing, budget management, homemaking tasks, and personal care were included.

The major objective for the personal style variables was to improve the mother's self-concept through the development of skills and to provide a better approach to home management through planning. Thus, predictable mealtimes, more efficient use of her food dollar and more attractive physical surroundings gave her a feeling of accomplishment and the approbation of her family members as a successful homemaker.

In the fourth domain, physical variables, the development of more nutritional meals is apparent from the foregoing. However, more active family outings and the development of a mother and father bowling league toward the end of the program attest to their growing interest and concern with physical development. They were introduced to agencies such as the medical and dental clinic, where some of them made arrangements for their own medical and dental care.

During the first phase of the mother's program, the overriding goal was to develop planfulness as the key to development of self and family organization.

The physical facilities at the Early Training Center include space for observation through one-way glass around two sides of the classroom. Initially the mothers observed from this area under the guidance of the home-visiting teacher in charge of the mothers' program. She encouraged and reinforced any verbalization the mothers made concerning the ongoing activities in the classroom. As they began to be more comfortable in the setting, the home visitor began to point out the more relevant aspects of the children's classroom program. Of particular concern were the control and management techniques, where positive reinforcement was emphasized for work well done and for the specific accomplishments of the children as they went about their classroom tasks. As the mothers became more attuned to the organization of the classroom for instruction and the purposes the activities were designed to accomplish, they were led in their observation to diagnose specific situations, to anticipate the outcomes, and to predict how the teacher would manage the problems she would meet.

At the same time, the mothers engaged in role-play activities to develop a repertoire of appropriate behavior to work in the classroom. Modeling upon the teacher's techniques and methods, they moved from reading stories to planning an activity lesson and carrying it out with their peers as their students. The observation and role play served to complement each other and to provide a concrete situation in which they could practice their skills. As the program moved along and as individual mothers were judged to be ready for classroom participation, their initial experience was planned. Their first entry into the classroom was always at the snack period. This provided them the opportunity to interact with the children as they were engaged in a self-reinforcing activity where behavior control was not a problem. They were encouraged to talk with the children about what they were eating, where it came from, and how it grew.

As they became facile in their interaction with a group of children, they were then introduced to a large group activity where they had no responsibilities for instruction but assisted in organizing and participated with the children in circle games. This kind of activity gave them more experience with anticipating behavioral difficulties and using positive behavior management procedures.

Next they graduated to an activity where they had to provide the structure for the situation. Here they could be in charge of a

housekeeping corner, a block play group, or the communications corner with telephones and recording devices. At this step it was necessary for them to plan the activity to some extent and to be resourceful in creating an inviting and stimulating situation for the children.

Finally, a formal lesson was their responsibility. At this level they prepared written lesson plans and carried them out. Following the lesson they evaluated as the regular classroom teachers did.

The overall objective of the second phase of the mothers' program was to provide a variety of contexts in which skills and abilities learned during the first phase could be generalized. The mothers continued their classroom participation on a regular basis, but small group meetings were held in individual homes on a rotating basis. This was supplemented by individual tutorials. Thus, the social responsibility of organizing and planning a meeting in one's home developed additional skills and provided the opportunity to implement and augment many of the instructional units on home management.

I have gone into the mothers' program at some length in order to develop some crucial points, which I believe are in keeping with the research literature of general psychology. (1) The activities were concrete and close to the day-to-day experience of the mother. They were designed to be intrinsically interesting and helpful. The average W. A. I. S. I. Q. of these mothers was approximately 85 at the beginning of the study, suggesting the level of operation that might be expected from them. (2) The program had specific objectives, which meant that the operations necessary to obtain those objectives could be clearly delineated. (3) The program was planned. Each step in the sequence was carefully designed to provide continuous movement and feedback to the subjects and allow accommodation of unanticipated contingencies. (4) The steps in the program were sequential and carefully monitored and guided. Careful program monitoring was important because one could be sensitive to individual differences within the group, providing the support necessary to build in intrinsic motivation for accomplishments. The steps in the program were of just manageable difficulty to insure success, often a new experience to women who have had a long history of failure. (5) The program was geared toward self-help, an important factor in providing the basis for developing competency and a feeling of self worth. (6) There was rapid feedback concerning performance. Since the program was so geared that success was almost inevitable, feedback most often was positive, indicating to the mother that she was a competent person.

Socialization for Competence--The Children's Program. The ecological observations which Maxine Schoggen of our laboratory has been conducting in the homes of disadvantaged families confirms our assumptions concerning the inadequacy of the role the mother takes as an instrumental agent in the child's ecological system. Perhaps the observation of greatest impact has been the relative lack of structure or organization evident. Few attempts have been observed to impose order upon the physical and temporal environment of the kind with which we are all familiar. Certainly this is not confined to the homes of lower socioeconomic groups, but it is an observation that is relatively general among them. It may well be a crucial defining variable in the operational definition of disadvantage.

Following George Kelly's (1955) thesis that man is basically a scientist and predictor, I would suggest that structure, order, indeed redundancy, is necessary to developing predictive accuracy. When he can predict events, he can choose appropriate behavioral alternatives to cope with the events, thus exercising a minimal control over them. As predicting skills increase both in accuracy and over greater intervals of time, he is able to exercise even greater control, increasing his opportunity for innovative and creative solutions to the problem which confront him. This is the essence of competency.

Evidence from a variety of sources in the psychological literature suggests that man strives to impose order and structure upon the environmental chaos in which he finds himself. More importantly, there is evidence to suggest that organizing and structuring skills are learned. As the child learns to impose order and structure upon his environment, he is able to process information much more economically and efficiently. Efficient informational processing is essential to predicting environmental events. We have assumed that this learning takes place relatively early and is particularly susceptible to retarded development given an inadequate instrumental agent.

Using an informational processing model, the skill development program was carefully constructed to consider all of the conceptual dimensions used by the major sense modalities in the ordering process. For instance color, shape, size, volume, time, numerical, positional, and whole-part-whole relationships representing relatively invariate conceptual areas were task analyzed according to the molar sensory processes needed to assimilate information. In this fashion the decoding skills for each of the major sense modalities were specified.

Once these specifications were made, the abstracting skills necessary for appropriate responses could be generated. On an a priori basis, the developmental sequence of matching (simple discrimination), recognition (appropriate response to a verbal label or command), identification (appropriate response to introduction of the stimulus), to response of choice (appropriate initiatory activity) became an instructional strategy. Evidence subsequently collected empirically demonstrated such ordering to be correct. (Gilmer, 1969)

This elaborate and detailed work, when accomplished, provided a sequential road map around which appropriate activities could be designed to develop the complex of skills we feel are necessary for the child to be competent and able to cope effectively with later school activities.

Careful introduction and ordering of new material and steps of just manageable difficulty helped in moving motivations from an extrinsic to an intrinsic locus. Such a strategy also insured success, which helped to develop task orientation in school-related activities. Since the curriculum was directed toward the development of skill and placing order upon ones environment, content--as such--took a secondary role. The basic conceptual skills were assumed to be relatively invariant while content changes over time. Much more important than changing content is the ability to recognize a set of three or five, to understand the positional concepts before, behind or through, and to discriminate rough from smooth or hot from cold. Content then became a vehicle for the development of skills. A unit approach was adopted which moved from the child himself through the family, school, local community, to urban and farm life. The unit emphasis was upon social studies, language, and science. Thus, within the context of ever broadening content areas, the skill development program increased in scope and the child developed ever more finely tuned capabilities.

Equally important to the development of coping skills was the development of attitudes necessary for sustaining developed skills and continuing the developmental momentum. Positive attitudes relating to school type activities, ability to delay reward, persistence, achievement motivation, and so forth, were a few of the major sustaining attitudes which were systematically programmed into the curriculum. By carefully sequencing activities and tasks to develop these motivations, the child gained greater control over himself and his environment.

Central to the aptitude and attitude development was the careful programming of reinforcement schedules to move the child from a concrete and extrinsic reward system to an abstract and intrinsic one. Careful contingency management was critical to the child's progress and his rapid development in the program.

Our goal has been to develop a curriculum based upon substantive research and theory with clearly defined goals and objectives. In this way we believe we are able to delineate the step-by-step procedures for obtaining our objectives which can be communicated easily for application in other contexts and with other populations.

Partial Interim Results

As you might imagine, the mountains of data which have accumulated over the two and a half years that the project has been under way give rise to great fears that we may be buried alive in our own data. First, a few general observations. In our work with various groups of children from disadvantaged environments, we have found that it is not much of a trick to obtain an average Binet I.Q. score gain of ten to fifteen points over a year of intervention. This is consistent with the findings of other intervention programs and appears to be about the asymptote which is generally obtained. The real trick is to maintain those gains over a period of time so that the usual picture of progressive decline does not emerge, thus the strategy of a broad program of skill development with a fundamental stress upon the sustaining motivations and the support systems with the family to insure continued development. The conclusion of whether or not the approach is sound, however, must wait for several years to follow the children in their careers.

First let us address ourselves to the question of vertical diffusion within the family. As the younger siblings in various groups have reached an age where they are capable of taking a test such as the Binet or a comprehensive skill development test based upon our curriculum, at least those two instruments have been administered. Gilmer (1969) has just completed an extensive analysis of the performance of younger siblings as a doctoral dissertation. In all comparisons of the younger siblings where the mothers have been enrolled in a training program, the younger sibling groups are superior to those where no parental contact has been maintained. The differences are particularly striking in more specific measures of concept development. In tasks requiring the child to engage in a series of match-to-sample problems, the two mothers' training groups are significantly

superior to the non-involved parental groups. These findings are relatively uniform across such tasks as recognition of choice problems involving the examiner's verbal command and identification tasks where the child must produce the proper abstract label. This would seem to lend evidence to the hypothesized critical role the mother plays as instrumental agent in structuring and ordering the environment. On the basis of these data, it seems safe to conclude that the first of our two experimental questions (1) Is the effect of diffusion reliable? and (2) Is the mother the crucial instrumental agent? can be answered in the affirmative.

One additional bit of evidence which underscores the importance of parental involvement is an analysis of the attendance records of the classroom groups. The absence ratio to attendance days was significantly greater for the uninvolved parental group when compared with the groups whose mothers were enrolled in the training program. The absence ratio was almost twice as high for non-involved parental subjects. Equally interesting is the unaccounted for finding that the absence ratio was significantly greater for girls than boys in those groups. The girls had almost twice as high a ratio as the boys.

Secondly, an analysis of the psychometric data for the classroom-age target children indicates performance of the two classroom groups to be significantly greater than the non-intervention groups, as well as the one which had only minimal intervention. Again these findings are not unexpected. The acid test will be whether or not the comparisons continue to hold up as the children progress through school and their gains are maintained over time. The answer to the third question then awaits the passage of time.

Far more interesting and perhaps far more important are the observations which have been made concerning the change in life style of these families.

Over 50 percent of the mothers have gone on to finish their high school education or enrolled in training courses to upgrade their vocational skills. Several have finished courses in cosmotology, while almost a fourth of the mothers have enrolled in and completed nurses aide or nursing technician courses and become licensed practical nurses. At the present time none of the Maximum Impact mothers are employed as domestics. Half of those who were employed as domestics at the beginning of the program have upgraded their employment status, while the other half have returned to their homemaking responsibilities

on a full-time basis. During the summer of 1967, two of the Maximum Impact mothers worked in Head Start centers as instructional aides, while another has taken on full-time work in a child day-care center. Two of the mothers who were originally functionally illiterate have gained reading skills to a third or fourth grade level through the help of other mothers in their group and the home-visiting teacher.

Their interest and concern in community affairs has also broadened. Several have served on their church boards for the first time after beginning work in the program. One has worked in Metropolitan Action Council elections, and two mothers have served as representatives on the council's board for the Head Start program.

The social contacts between the parents and with other members of the community have increased markedly. On their own volition they developed a parent organization which has organized cooperative picnics and outings for the families on weekends, developed a rotating book library and organized a mother-father bowling league in order to continue the relationship which has developed over the past two years.

One of our greatest problems has been to keep the members of our groups in the housing project until the completion of the intervention. They have developed a marked interest in buying their own homes. Indeed, two families have bought homes while continuing their children in the classroom program by providing their own transportation. At the end of the 1968 summer, many suggested the desire to move on to better housing of their own.

The increase in savings accounts and checking accounts has been marked. In each instance they cite this as an aid in helping them to budget their income. This outcome is interesting since few of the mothers were able to define the term budget when we began our program.

The family of most desperate means has shown such a remarkable change in furnishing their home and taking responsible care of the grounds around their apartment that neighbors have contacted the home-visitor to remark about the family's progress since their involvement with the project.

In addition to these observations, which are but a few of the markers of change since the beginning of the program, our staff continually reports being asked into the homes of non-participating families

to evaluate educational experiences being provided their children--a "horizontal diffusion effect," if you will.

While it is impossible to point with certainty to these events as being directly caused by our intervention program in the housing project, we would claim at least indirect influence. These results lead us to have greater confidence in our objective data. Certainly the manifest change in the life styles of these families--from the status of environmental victims to people who are beginning to develop environmental mastery--should have a supporting effect on their children's continued development.

A Small Concluding Footnote

I must concur completely with the statement Professor John McDavid recently made. It is well worth repeating.

> "Perhaps the most embarrassing massive error ever made in educational research [has been] our commitment to IQ testing as a criterion for measuring the effectiveness of educational practice. For forty years, psychologists and educators have interchanged the terms "IQ" and "intelligence" without recognizing that they have changed the subject. The concept of intelligence is an abstraction, an intangible quality of capacity or ability which, as far as I am concerned, has never been directly measured and never will be. In contrast, an IQ is an empirical index, the result of measured performance. But performance and capacity are not identical. Indeed, capacity may set the upper limit for performance, but it is certainly illogical to conclude that performance sets the upper limit of capacity. What a magnificent waste to have invested several decades in the game of academic arguments as to whether or not intelligence is modified through experience! Given the techniques of assessment available to us, we cannot even begin to properly answer that question. Again and again for years we have demonstrated that experience may modify performance (in other words, IQ scores). But we have never had data affording any conclusion as to whether capacity (in other words, intelligence) is modifiable. My heresy in challenging the appropriateness of IQ tests as criteria for gauging educational impact should not detract from the

> value of the host of significant studies of conditions which influence IQ test performance..... But why do we persist in arguing that these studies have anything to do directly with the modification of intellectual capacity? Why don't we settle for the fact that we have learned a great deal about how to modify a child's performance, but that we still know very little about modification of a child's intellectual capacity?"

Another question that often arises in discussions of intervention research is that of values. The question is often raised by some well-meaning but misguided person that we are changing the value system of our families to that of the middle class. In working with families from disadvantaged backgrounds, we have taken the stand that there is nothing quaint about poverty, nothing socially uplifting about hunger, nothing self-rewarding about hopelessness, nothing inspiring about ignorance, and nothing culturally valuable about despair. We have assumed that to have the freedom of choice one must have the skills to make decisions. If one is going to have the right opportunity, one must be prepared adequately to take advantage of it. To be socially competent, one must be able to compete effectively for the rewards society has to offer. One must also be able to forge new roles which enhance oneself. This intervention research then is value-oriented in the sense that it is based on the notion that social competency emanates from the development of adequate cognitive skills and the sustaining motivational states upon which self-development depends.

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